Montana
Engineering Practice Planning and Design Guide
for
Irrigation Water Management

	References	✓
RESOURCE INVENTORY	NPM 506.10	
(You may use Irrigation Inventory Worksheet, MIM Pages 13-63.)	MIM Ch 9	
1. Measure acres to be managed.		❒ ×
2. Determine crops to be grown, cropping systems to be used.		
▪ Crop type, planting and harvest dates		❒ ×
▪ Crop rotation	FOTG	❒ ×
▪ Tillage systems	FOTG	❒ ×
▪ Crop residue management	FOTG	❒ ×
▪ Chemical usage (WRAP computer program)	FOTG	❒ ×
3. Gather information on soils. Dig holes if necessary. Obtain survey by soil scientist if needed.	Soil Survey NPM MT506.15	
▪ Available Water Capacity (AWC)	MIG	❒ ×
▪ Intake rate characteristics	MIG	❒ ×
▪ Restrictive layers		❒ ×
4. Gather information on topography.		
▪ Slopes, relief		❒ ×
▪ Obstructions to management of system		❒ ×
▪ Layout of systems as it affects management		❒ ×
5. Gather quantitative information about existing erosion problems.		
▪ Estimate amount of erosion using currently available procedures	FOTG	❒ ×
▪ Determine amount of erosion using field measurements		❒
6. Determine crop water use characteristics.		
▪ Monthly consumptive use	MIG	❒
▪ Peak daily consumptive use	MIG	❒ ×

	References	✓
▪ Rooting depth at various times during season	MIG	❒ ×
▪ Potential for erosion	MIG	❒ ×
7. Data concerning water source:		
▪ Source of water		❒ ×
▪ Seasonal water reliability, availability, water rights, regulations		❒ ×
▪ Water quality, moss, debris, sediment problems		❒ ×
▪ Typical water availability times, restrictions		❒ ×
▪ Water measurement procedures used		❒ ×
Does irrigator know how much water is used in terms of real units (in/acre, gpm, cfs, minors inches)?		❒ ×
Is water measured at delivery point to farm?		❒ ×
Is water measured at delivery to each field?		❒ ×
8. Obtain all information needed about management of the existing delivery system (from operator, ditch company or district, NRCS case files, delivery system maps, observation, and/or measurement.		
▪ Type of delivery system		❒ ×
▪ Details of delivery system management		
Direct diversion		❒
Rotation		❒
Arranged		❒
Demand		❒ ×
▪ Delivery system management policies, restrictions		❒ ×
▪ Capacity of system components (may need to measure flow rates)		❒ ×
▪ Ditch material and lining characteristics for estimating conveyance losses		❒
9. Existing and proposed application system:		
▪ Type of system (furrow, graded border, side roll, pivot, hand move, etc.)		❒ ×
▪ Details of system that affect efficiency		❒ ×
Type of sprinkler nozzles, pressures		❒
Degree of land leveling		❒
Furrow and border widths		❒

	References	✓
▪ Estimated or measured system application efficiency		❒ ×
▪ Flow rate and pressure requirements at each turnout		❒
▪ Existing system maintenance needs and quality		❒ ×
▪ Is there tailwater reuse?		❒ ×
▪ Does wind affect system?		❒
10. How is it now determined when and how much to irrigate?		❒ ×
11. Labor availability and skill		
▪ How much labor is available?		❒ ×
▪ At what times of day is labor available?		❒ ×
▪ Skill level of labor?		❒ ×
12. Present problems in managing irrigation water.		❒ ×
INTERPRETING, ANALYZING, AND EVALUATING		
1. Is irrigator/landuser willing to consider improving water management?		❒ ×
2. Are there high cost items, such as power, labor or water, that make the irrigator/landuser motivated to improve irrigation efficiency?		❒ ×
3. Based on restrictions imposed, can changes be made?		❒ ×
▪ Imposed by water supply limitations and restrictions		❒ ×
▪ Imposed by limitations of the system		❒ ×
▪ Imposed by economics		❒ ×
▪ Imposed by crop cultural operations		❒ ×
▪ Imposed by field physical considerations		❒ ×
▪ Imposed by labor considerations		❒ ×
DEVELOPING AND EVALUATING ALTERNATIVES		
1. Determine Available Water Capacity (AWC), Management Allowed Depletion (MAD) and intake characteristics of soil.	MIG	❒ ×
2. Analyze seasonal efficiency and how changes in system and management could be improved (use FIRS computer progam).	FIRS doc.	❒ ×
3. Determine peak consumptive use for crops to be grown (may use tables in Irrigation Guide or TR21 computer program).	MIM Ch 4 MIG	❒ ×
4. Determine minimum flow requirements during period of peak consumptive use (may use Irrigation Planning Worksheet MIM, Pages 13-69).	MIM Ch 9	❒

		References	✓
5.	Determine flow requirements required to complete irrigation during time period desired by irrigator.	MIM Ch 9	❒ ×
6.	Based on the irrigation system design or existing system, prepare information on alternative methods of:		
	▪ Determining when and how much to irrigate		❒ ×
	▪ Knowing how much is being put on		❒ ×
	▪ Monitoring soil moisture or crop use		❒ ×
	▪ System operation considerations		❒ ×
	▪ System improvements which would lead to better water management		❒
IMPLEMENTING DECISIONS		NPM 506.10	
Implementation of water management plan			
1.	Provide all basic information on the selected alternative water management plan needed by the irrigator.		❒ ×
2.	Explain that the management data we provide is only a start, and that operational and seasonal adjustments may be needed.		❒ ×
3.	Show how to perform operations such as the Feel and Appearance Method.		❒ ×
4.	Follow up with the irrigator to make sure procedures are working and adjustments are being made.		❒ ×

× This activity or documentation is usually required on each job.